CLAIMS

1. An oil pump rotor assembly comprising:

an inner rotor having "n" external teeth ("n" is a natural number); and

an outer rotor having (n+1) internal teeth which are engageable with the external teeth,

wherein the oil pump rotor assembly is used in an oil pump which, during rotation of the inner and outer rotors, draws and discharges fluid by volume change of cells formed between the inner rotor and the outer rotor,

wherein when a clearance, which is defined between the teeth of the inner and outer rotors that together form one of the cells which has the minimum volume among the cells, is designated as "a", a clearance, which is defined between the teeth of the inner and outer rotors that together form one of the cells whose volume is increasing during rotation of the inner and outer rotors, is designated as "b", and a clearance, which is defined between the teeth of the inner and outer rotors that together form one of the cells which has the maximum volume among the cells, is designated as "c", the following inequalities are satisfied:

$a \leq b \leq c$, and $a < c$, and

wherein when the clearance "b" of the cell positioned forward as viewed in the direction of rotation is further designated as "b1", and the clearance "b" in the cell positioned backward as viewed in the direction of rotation is further designated as "b2", the following inequality is satisfied:

$b1 \leq b2$.

2. An oil pump rotor assembly according to claim 1,

wherein when a clearance, which is defined between the teeth of the inner and outer rotors that together form one of the cells whose volume is decreasing during rotation of the inner and outer rotors, is designated as "d", the following inequalities are satisfied:

$a \leq b \leq c$, $a < c$, and $a \leq d \leq c$, and

wherein when the clearance "d" in the cell positioned backward as viewed in the direction of rotation is further designated as "d1", and the clearance "d" in the cell positioned forward as viewed in the direction of rotation is further designated as "d2", the following inequality is satisfied:

$d1 \geq d2$.

3. An oil pump rotor assembly comprising:

an inner rotor having "n" external teeth ("n" is a natural number); and

an outer rotor having (n+1) internal teeth which are engageable with the external teeth,

wherein the oil pump rotor assembly is used in an oil pump which, during rotation of the inner and outer rotors, draws and discharges fluid by volume change of cells formed between the inner rotor and the outer rotor, and

wherein a clearance, which is defined between the teeth of the inner and outer rotors that together form one of the cells, gradually increases as the cell rotationally moves from a position at which the volume of the cell is minimized to a position at which the volume of the cell is maximized.

4. An oil pump rotor assembly according to claim 3, wherein the clearance, which is defined between the teeth of the inner and outer rotors that together form one of the

cells, gradually decreases as the cell rotationally moves from a position at which the volume of the cell is maximized to a position at which the volume of the cell is minimized.

5. An oil pump rotor assembly according to one of claims 1 to 4, wherein the tooth surfaces of the inner and outer rotors are respectively formed using cycloid curves which are formed by rolling respective rolling circles along respective base circles without slip.

6. An oil pump rotor assembly according to one of claims 1 to 4, wherein the tooth surfaces of the inner rotor are formed using a trochoid envelope curve which is formed by moving a trajectory circle, whose center is positioned on a trochoid curve, along the trochoid curve, and the tooth tips of the outer rotor are formed using an arc having the same radius as that of the trajectory circle.

7. An oil pump rotor assembly according to one of claims 1 and 3,

wherein each of the tooth profiles of the inner rotor is formed such that the tip profile thereof is formed using an epicycloid curve which is formed by rolling a first circumscribed-rolling circle Ai along a base circle Di without slip, and the tooth space profile thereof is formed using a hypocycloid curve which is formed by rolling a first inscribed-rolling circle Bi along the base circle Di without slip, and each of the tooth profiles of the outer rotor is formed such that the tip profile thereof is formed using an epicycloid curve which is formed by rolling a second circumscribed-rolling circle Ao along a base circle Do without slip, and the tip profile thereof is formed using a hypocycloid curve which is formed by rolling a second inscribed-rolling circle Bo along the base circle Do without slip, and

wherein the inner rotor and the outer rotor are formed such that the following equations are satisfied:

$\o Bo=\o Bi$;

$\o Do=\o Di\cdot(n+1)/n+t\cdot(n+1)/(n+2)$; and

$\o Ao=\o Ai+t/(n+2)$,

where øDi is the diameter of the base circle Di of the inner rotor, øAi is the diameter of the first circumscribed-rolling circle Ao, øBi is the diameter of the first inscribed-rolling circle Bi, øDo is the diameter of the base circle Do of the outer rotor, øAo is the diameter of the second circumscribed-rolling circle Ao, øBo is the diameter of the second inscribed-rolling circle Bo, and t ($\neq 0$) is a clearance between the tooth tip of the inner rotor and the tooth tip of the outer rotor.

8. An oil pump rotor assembly according to one of claims 1 and 3,

wherein each of the tooth profiles of the inner rotor is formed such that the tip profile thereof is formed using an epicycloid curve which is formed by rolling a first circumscribed-rolling circle Di along a base circle "bi" without slip, and the tooth space profile thereof is formed using a hypocycloid curve which is formed by rolling a first inscribed-rolling circle "di" along the base circle "bi" without slip, and each of the tooth profiles of the outer rotor is formed such that the tip profile thereof is formed using an epicycloid curve which is formed by rolling a second circumscribed-rolling circle Do along a base circle "bo" without slip, and the tip profile thereof is formed using a hypocycloid curve which is formed by rolling a second inscribed-rolling circle "do" along the base circle "bo" without slip, and

wherein the inner rotor and the outer rotor are formed such that the following equations and inequalities are satisfied:

$\o bi=n\cdot(\o Di+\o di)$;

$\o bo=(n+1)\cdot(\o Do+\o do)$;

one of $\o Di+\o di=2e$ and $\o Do+\o do=2e$;

$\o Do > \o Di$;

$\o di > \o do$; and

$(\o Di+\o di) < (\o Do+\o do)$,

where øbi is the diameter of the base circle "bi" of the inner rotor, øDi is the diameter of the first circumscribed-rolling circle Di, ødi is the diameter of the first inscribed-rolling circle "di", øbo is the diameter of the base circle "bo" of the outer rotor, øDo is the diameter of the second circumscribed-rolling circle Do, ødo is the diameter of the second inscribed-rolling circle "do", and "e" is an eccentricity distance between the inner and outer rotors.